CLAIMS

1. A method of mapping a packet orientated client signal to a synchronous network payload, the method including the steps of:

receiving said client signal;

processing said client signal to a form suitable for mapping to said payload which preserves a buffer-to-buffer flow control mechanism of the client signal, wherein said step of processing reduces the bandwidth of the client signal while maintaining the integrity of a payload of the client signal;

and mapping said processed signal to said synchronous network payload.

2. A method as claimed in claim 1, wherein the bandwidth is reduced by removing redundant information from said client signal.

3. A method as claimed in claim 1, wherein the bandwidth is reduced by removing idles from said client signal.

4. A method as claimed in claim 1, wherein the bandwidth is reduced by removing at least one primitive sequence which forms part of a series of repeated primitive sequences in said client signal.

5. A method as claimed in claim 1, wherein in the step of preserving the buffer-to-buffer flow control mechanism of the client signal, said buffer-to-buffer flow control mechanism is provided according to a Fibre Channel protocol class of service.

6. A method as claimed in claim 1, wherein in the step of preserving the buffer-to-buffer flow control mechanism of the client signal, said buffer-to-buffer flow control mechanism is provided according to an ESCON protocol class of service.

7. A method as claimed in claim 1, wherein said packet orientated client signal is provided according to a higher level protocol supported by said Fibre Channel protocol and which has a buffer-to-buffer flow control mechanism provided according to a Fibre Channel protocol class of service.

8. A method as claimed in claim 1, wherein the synchronous payload is taken from the group consisting of: one or more SONET virtual container payloads, one or more SDH virtual container payloads; two or more virtually concatenated SONET virtual container payloads; two or more virtually concatenated SDH virtual container payloads; two or more contiguously concatenated SONET virtual container payloads; two or more contiguously concatenated SDH virtual container payloads.

9. A method as claimed in claim 1, wherein said step of processing the client signal further includes a step of removing line encoding.

10. A method as claimed in claim 1, further including the step of padding said processed client signal so that said processed client signal is appropriately padded to fill a predetermined synchronous payload bandwidth.

11. A method as claimed in claim 1, wherein the bandwidth of the synchronous payload is allocated by a network management system.

12. A method as claimed in claim 1, wherein the bandwidth of the synchronous payload is allocated by an apparatus implementing the method of mapping.

13. A method of mapping as claimed in claim 1, wherein the synchronous payload bandwidth is modified in response to customer bandwidth demands increasing/decreasing.

14. A method of mapping as claimed in claim 1, wherein the synchronous payload bandwidth is modified in response to changes in data throughput as distance between the end data packet nodes changes.

15. A method as claimed in claim 1, wherein a plurality of clients signals are multiplexed together to share said synchronous payload.

16. A method of mapping a packet oriented client signal that uses a buffer-to-buffer flow control mechanism to a synchronous transmission network payload, the method comprising the steps of:

processing said client signal to remove at least one ordered set provided according to a protocol of said client signal to form a second signal;

storing the second signal in an ingress buffer; and

mapping the second signal to said synchronous payload,

wherein said steps of processing said client signal and mapping said second signal preserves the buffer-to-buffer flow control mechanism of the client signal and maintains the integrity of the payload of the client signal.

17. A method as claimed in claim 16, wherein said ordered set provides redundant data in said client signal.

18. A method as claimed in claim 16, wherein said ordered set provides redundant data comprising at least one client signal idle.

19. A method as claimed in claim 16, wherein said ordered set provides redundant data comprising at least one client signal primitive sequence which is repeated in a series of client signal primitive sequences.

20. A method of restoring a packet oriented client signal from at least one synchronous network payload, the method comprising the steps of:

receiving said synchronous payload;

de-mapping said signal from said synchronous payload;

storing said signal in an egress buffer; and

processing said signal to add at least one ordered set provided according to a protocol of said packet orientated client signal, wherein said method of restoring the client signal maintains the integrity of the payload of said packet oriented client signal and preserves a buffer-to-buffer flow control mechanism of said client signal.

21. A method as claimed in claim 20, wherein said step of de-mapping includes removing at least one padding character added to said signal prior to being mapped to said synchronous payload.

22. A method as claimed in claim 20, wherein said at least one ordered set is a client signal idle inserted between client signal packets in said signal according to the client signal protocol.

23. A method as claimed in claim 20, said at least one ordered set is a primitive sequence inserted to form a series of primitive sequences in accordance with the client signal protocol.

24. Apparatus adapted to perform steps in a method of mapping a client signal comprising a packet oriented client signal that uses a buffer-to-buffer flow control mechanism to a synchronous transmission network payload, the apparatus comprising:

a processor for processing said client signal to remove at least one ordered set provided according to a protocol of said client signal to form a second signal;

a buffer for storing the processed client signal in an ingress buffer; and

a mapper for mapping the processed client signal to said synchronous payload,

wherein said apparatus preserves the buffer-to-buffer flow control mechanism of the client signal and maintains the integrity of the payload of the client signal.

25. Apparatus as claimed in claim 24, wherein the apparatus is provided in a network element supporting said client signal.

26. Apparatus as claimed in claim 24, wherein the apparatus is provided in a network element supporting said synchronous network payload.

27. A network element comprising apparatus as claimed in claim 25.

28. A network element comprising apparatus as claimed in claim 26.

29. A signal comprising a set of one or more synchronous containers, wherein the payload of said one or more synchronous containers comprises a client signal adapted to a reduced bandwidth format, wherein the integrity of the payload of said client signal is preserved in said synchronous payload,

and wherein a buffer-to-buffer flow control mechanism of said client signal is preserved in said synchronous payload.

30. A method of load balancing traffic comprising a packet orientated client signal across a synchronous network, wherein said traffic comprises at least one synchronous network payload comprising a packet oriented client signal which is controlled by a buffer-to-buffer flow control mechanism, the signal having been mapped to a synchronous network payload, using a method including the steps of: receiving said client signal; processing said client signal to a form suitable for mapping to said payload which preserves a buffer-to-buffer flow control mechanism of the client signal, wherein said step of processing reduces the bandwidth of the client signal while maintaining the integrity of a payload of the client signal; and mapping said processed signal to said synchronous network payload, wherein said method of load balancing comprises the steps of:

pre-allocating an initial bandwidth of said synchronous network payload according to a predetermined condition , wherein said payload comprises a plurality of virtually concatenated virtual containers;

diversely routing said synchronous network payload over said synchronous network; and

In the event of a change in a condition of the network, modifiying the allocated bandwidth.

31. A method of load balancing traffic as claimed in claim 30, wherein bandwidth is automatically modified.

32. A method of load balancing traffic as claimed in claim 30, wherein the bandwidth is automatically modified by the apparatus performing the method of mapping.

33. A method of load balancing traffic as claimed in claim 30, wherein said pre-allocation bandwidth is determined by requirements requested by a user of the network.

34. A method of load balancing traffic as claimed in claim 30, wherein said pre-allocation is automatic.

35. A method of load balancing traffic as claimed in claim 30 wherein said pre-allocation is determined by the condition of the synchronous network.

36. A method of allocating bandwidth in a synchronous digital network for a packet oriented signal having buffer-to-buffer flow control, the method comprising the steps of:

received said packet oriented signal;

processing said packet oriented signal to a processed signal having a form suitable for mapping to a synchronous network payload, wherein the processing preserves a buffer-to-buffer flow control mechanism of said packet oriented signal, wherein said step of processing removes redundant information from the packet oriented signal while maintaining the integrity of a payload of the packet oriented signal;

and mapping said processed signal to a said synchronous network payload having a bandwidth determined according to the bandwidth of said processed signal.